

Bretz, Todd

From: Bretz, Todd
Sent: Wednesday, March 16, 2011 4:06 PM
To: 'Farrah.Gaskins@NRC.gov'
Cc: Pyle, Richard A
Subject: Completed NUREG-1556 Vol. 4 Appendix B Checklist
Attachments: Farrah.Gaskins@NRC.gov_001.pdf

Licensing Assistance Team
Division of Nuclear Materials Safety
U.S. Nuclear Regulatory Commission - Region 1
475 Allendale Road
King of Prussia, PA 19406-1415

Ref: NRC Form 313 - New License Application Addendum
Mail Control# 574-436

Att: **Farrah Gaskins**
Dear Ms. Gaskins,

Per our discussion, please find attached a completed NUREG-1556 Vol. 4 - Appendix B Checklist to support our facility's application submittal.

If there are any questions or concerns related to the application for material license please contact me.

Sincerely,



Todd E. Bretz, CSP
Refinery Safety Supervisor

Delaware City Refining Company, LLC
4550 Wrangle Hill Road
Delaware City, DE 19706

Tel: (302) 836-6609
Cell: (609) 828-3435
E-Mail: Todd.Bretz@PBFEnergy.com

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NMSS/RGN1 MATERIALS-002



Appendix B

Suggested Format for Providing Information Requested in Items 5 Through 11 of NRC Form 313

APPENDIX B

Suggested Format for Providing Information Requested in Items 5 Through 11 of NRC Form 313

Table B.1 Items 5 & 6: Materials To Be Possessed and Proposed Uses

Yes	No	Radioisotope	Manufacturer or Distributor Model No.	Quantity	Use As Listed on SSD Certificate	Specify Other Uses Not Listed on SSD Certificate
	X	Cobalt-60	Sealed source manufacturer or distributor and model number: Device manufacturer or distributor and model number:	Not to exceed either the maximum activity per source or maximum activity per device as specified in Sealed Source and Device Registration Certificate	Yes [] Specific description of the gauge use: _____ _____ _____	[] Not applicable [] Uses are: _____ (Submit safety analysis supporting safe use)
	X	Krypton-85	Sealed source manufacturer or distributor and model number: Device manufacturer or distributor and model number:	Not to exceed either the maximum activity per source or maximum activity per device as specified in Sealed Source and Device Registration Certificate	Yes [] Specific description of the gauge use: _____ _____ _____	[] Not applicable [] Uses are: _____ (Submit safety analysis supporting safe use)
	X	Strontium-90	Sealed source manufacturer or distributor and model number: Device manufacturer or distributor and model number:	Not to exceed either the maximum activity per source or maximum activity per device as specified in Sealed Source and Device Registration Certificate	Yes [] Specific description of the gauge use: _____ _____ _____	[] Not applicable [] Uses are: _____ (Submit safety analysis supporting safe use)
X		Cesium-137	Sealed source manufacturer or distributor and model number: Device manufacturer or distributor and model number:	Not to exceed either the maximum activity per source or maximum activity per device as specified in Sealed Source and Device Registration Certificate	Yes X Specific description of the gauge use: See Attached _____ _____	[] Not applicable [] Uses are: _____ (Submit safety analysis supporting safe use)

TN Tech SSRD 5205
 TN Tech SSRD 5204
 Thermo SSRD 5201
 Key Run SSRD 7063

B-1

See Attached.

APPENDIX B

Yes	No	Radioisotope	Manufacturer or Distributor Model No.	Quantity	Use As Listed on SSD Certificate	Specify Other Uses Not Listed on SSD Certificate
	X	Americium-241	Sealed source manufacturer or distributor and model number: Device manufacturer or distributor and model number:	Not to exceed either the maximum activity per source or maximum activity per device as specified in Sealed Source and Device Registration Certificate	Yes [] Specific description of the gauge use: _____ _____ _____	[] Not applicable [] Uses are: _____ (Submit safety analysis supporting safe use)
	X	Other Isotope (Specify):	Sealed source manufacturer or distributor and model number: Device manufacturer or distributor and model number:	Not to exceed either the maximum activity per source or maximum activity per device as specified in Sealed Source and Device Registration Certificate	Yes [] Specific description of the gauge use: _____ _____ _____	[] Not applicable [] Uses are: _____ (Submit safety analysis supporting safe use)
<i>Financial Assurance Required and Evidence of Financial Assurance Provided</i>						

APPENDIX B

Table B.2 Items 7 Through 11: Training and Experience, Facilities and Equipment, Radiation Safety Program, and Waste Disposal

Item No. and Title	Suggested Response	Yes	Alternative Procedures Attached
<p>7. Individual(s) Responsible For Radiation Safety Program And Their Training And Experience</p> <p>7.1 Radiation Safety Officer</p> <p>Name: _____ Rick Pyle</p>	<p>Before obtaining licensed materials, the proposed RSO will have successfully completed the training described in Criteria in the section entitled "Individual(s) Responsible for Radiation Safety Program and Their Training and Experience - Radiation Safety Officer" in NUREG-1556, Vol. 4, dated October 1998.</p> <p style="text-align: center;">AND</p> <p>Before being named as the RSO, future RSOs will have successfully completed the training described in Criteria in the section entitled "Individual(s) Responsible for Radiation Safety Program and Their Training and Experience - Radiation Safety Officer" in NUREG-1556, Vol. 4, dated October 1998. Within 30 days of naming a new RSO, we will submit the new RSO's name to NRC to include in our license.</p>	X	[]
<p>7. Individual(s) Responsible For Radiation Safety Program And Their Training And Experience</p> <p>7.2 Authorized Users</p>	<p>PROPOSED AUTHORIZED USERS:</p> <p>Before using licensed materials, authorized users will have successfully completed the training described in Criteria in the section entitled, "Authorized Users" in NUREG-1556, Vol. 4, dated October 1998.</p>	X	[]
<p>8. Training for Individuals Who in the Course of Employment are Likely to Receive Occupational Doses of Radiation in Excess of 1 mSv (100 mrem) in a Year (Occupationally Exposed Workers) and Ancillary Personnel</p>	<p>The applicant is <i>not</i> required to, and should not, submit its training program, for individuals who in the course of employment are likely to receive occupational doses of radiation in excess of 1 mSv (100 mrem) in a year (occupationally exposed workers) and ancillary personnel, to the NRC for review during the licensing phase.</p>	Need Not Be Submitted with Application	

APPENDIX B

Item No. and Title	Suggested Response	Yes	Alternative Procedures Attached
9. Facilities and Equipment	We will ensure that the location of each fixed gauge meets the Criteria in the section entitled "Facilities and Equipment" in NUREG-1556, Vol. 4, dated October 1998.	X	[]
10. Radiation Safety Program - Audit Program	The applicant is <i>not</i> required to, and should not, submit its audit program to the NRC for review during the licensing phase.	Need Not Be Submitted with Application	
10. Radiation Safety Program - Survey Instruments	<p>Surveys pursuant to 10 CFR 20.1501 will be performed by a person specifically authorized by the NRC or an Agreement State to perform these surveys.</p> <p style="text-align: center;">OR</p> <p>We will use instruments that meet the Criteria in the section entitled "Radiation Safety Program - Instruments," in NUREG-1556, Vol. 4, dated August 1998, and <i>one</i> of the following:</p> <p>Each survey meter will be calibrated by the manufacturer or other person authorized by the NRC or an Agreement State to perform survey meter calibrations.</p> <p style="text-align: center;">OR</p> <p>We will implement the model survey instrument calibration program in Appendix I to NUREG-1556, Vol. 4, dated October 1998.</p>	X	[]
10. Radiation Safety Program - Material Receipt and Accountability	Physical inventories will be conducted at intervals not to exceed 6 months or at other intervals approved by the NRC, to account for all sealed sources and devices received and possessed under the license.	X	[]
10. Radiation Safety Program - Occupational Dosimetry	We will perform a prospective evaluation demonstrating that unmonitored individuals are not likely to receive, in one year, a radiation dose in excess of 10% of the allowable limits in 10 CFR Part 20 or we will provide dosimetry that meets the Criteria in the section entitled "Radiation Safety Program - Occupational Dosimetry," in NUREG-1556, Vol. 4, dated October 1998.	X	[]

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Item No. and Title	Suggested Response	Yes	Alternative Procedures Attached
10. Radiation Safety Program - Maintenance	<p><u>ROUTINE MAINTENANCE</u> We will implement and maintain procedures for routine maintenance of our fixed gauges according to each manufacturer's or distributor's written recommendations and instructions.</p> <p><u>NON-ROUTINE MAINTENANCE OPERATIONS</u> The gauge manufacturer, distributor or other person authorized by NRC or an Agreement State will perform non-routine operations such as installation, initial radiation survey, repair, and maintenance of components related to the radiological safety of the gauge, gauge relocation, replacement, and disposal of sealed sources, alignment, or removal of a gauge from service.</p>	X	<p style="text-align: center;">[]</p> <p>[] The information listed in Appendix N supporting a request to perform non-routing operations in-house is attached</p>
10. Radiation Safety Program - Transportation	The applicant is <i>not</i> required to submit its response to transportation during the licensing process; this issue will be reviewed during inspection. However, the licensee should develop, implement, and maintain transportation procedures according to NRC and DOT regulations.	Need Not Be Submitted with Application	
10. Radiation Safety Program - Fixed Gauges Used at Temporary Job Sites	<p>This is not applicable to our program. We will not use fixed gauges at temporary job sites.</p> <p style="text-align: center;">OR</p> <p>We will develop, implement, maintain and distribute procedures that meet the Criteria in the section entitled "Radiation Safety Program - Fixed Gauges Used at Temporary Job Sites" in NUREG-1556, Vol. 4, dated October 1998.</p>	X Not Applicable	[]
10. Radiation Safety Program - Minimization of Contamination	The applicant is not required to submit a response to minimization of contamination if the applicant's responses meet the criteria for the following sections: Radioactive Material - Sealed Sources and Devices, Facilities and Equipment, Radiation Safety Program - Operating and Emergency Procedures, Radiation Safety Program - Leak Testing, and Waste Management - Gauge Transfer and Disposal.	Need Not Be Submitted with Application	

APPENDIX B

Item No. and Title	Suggested Response	Yes	Alternative Procedures Attached
11. Waste Management - Gauge Disposal & Transfer	The applicant is not required to submit a response to waste management during the licensing process. However, the licensee should develop, implement, and maintain gauge transfer and disposal procedures in its radiation protection program.		Need Not Be Submitted with Application

Feb 2011

SSDR 5204

REGISTRY OF RADIOACTIVE SEALED SOURCES AND DEVICES
SAFETY EVALUATION OF DEVICE

NO: TX634D141B

DATE: February 18, 1983

PAGE 1 OF 6

DEVICE TYPE: Source Housing

MODEL: 5204

MANUFACTURER/DISTRIBUTOR:

TN TECHNOLOGIES INC
A THERMO INSTRUMENTS COMPANY
2555 NORTH INTERSTATE 35 (78664)
P.O. BOX 800
ROUND ROCK, TEXAS 78680-0800

SEALED SOURCE MODEL DESIGNATION: Texas Nuclear Model 57157C

ISOTOPE: Cs-137
Co-60

MAXIMUM ACTIVITY: 10 Curies
500 millicuries

LEAK TEST FREQUENCY: 36 months

PRINCIPAL USE: Gamma Gauges

CUSTOM DEVICE: _____ YES X _____ NO

CUSTOM USER:

REGISTRY OF RADIOACTIVE SEALED SOURCES AND DEVICES
SAFETY EVALUATION OF DEVICENO: TX634D141BDATE: February 18, 1983Page 2 OF 6DEVICE TYPE: Source Housing

DESCRIPTION: This source housing is constructed of lead-filled, welded steel containing all of the features normally associated with a manually operated device. The source housing is a right circular cylinder welded to a base plate and mounted with two welded steel "L" bars. It is approximately 7.5 inches in diameter by 8 inches high by 12.25 inches wide and weighs approximately 167 pounds.

The source is retained in the lead filled housing by the use of a spring load, stainless steel spacer, stainless steel internal snap ring and a stainless steel source tube and is sealed from the environment by a stainless steel expansion plug.

The shutter is comprised of a lead-filled, all welded stainless steel canister secured by welding a steel guide bolt to a steel bar to prevent it from inadvertent movement by vibration or shock. The shutter has both an ON and OFF position indicated on the source head by tags and is secured in the OFF position by lock and the ON position by pin. In the ON position, the beam is emitted into approximately a 13 degree beam angle, conical in shape.

LABELING: The gauge is tagged with a standard tag, containing the company's name, trade mark, and symbol and the model, isotope, amount of activity, date of measurement, CAUTION RADIOACTIVE MATERIAL, and DO NOT REMOVE. The tag is stainless steel and the radiation symbol is color coded. Additionally, the device contains a separate caution tag which uses both words and symbols to caution users to keep their hands out of the beam area as an added safety feature. The third tag is a shipping bolt tag which serves to caution those individuals not authorized to install and survey gauging devices not to proceed with opening the shutter. For those devices distributed to general licensees, another tag will be added which specifies all details and conditions of general license distribution and the requirements that the user must follow as set out in the Texas Regulations for Control of Radiation 41.28 (d)(1)(iii). These tags are manufactured using a second surface printed polyester laminated with pressure sensitive adhesive. These tags are approved by UL and CSA with these adhesives and tamperproof construction.

REGISTRY OF RADIOACTIVE SEALED SOURCES AND DEVICES
SAFETY EVALUATION OF DEVICE

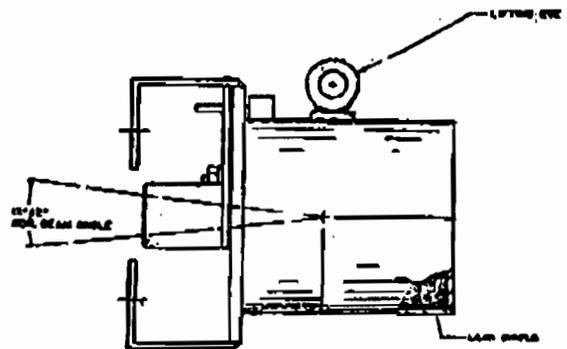
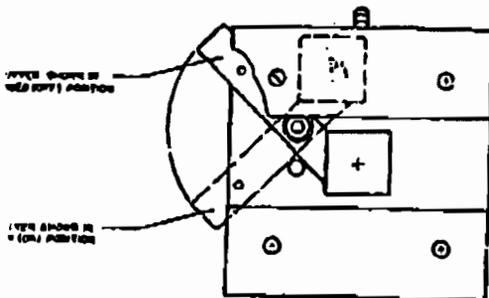
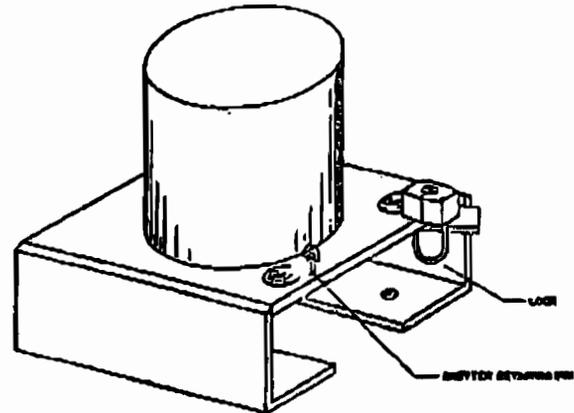
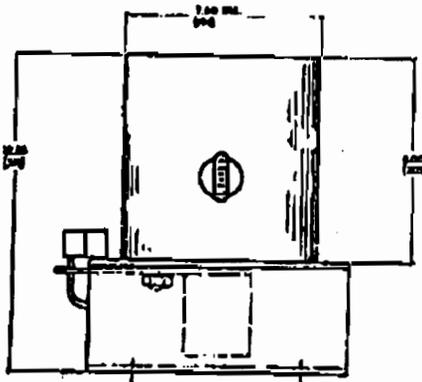
NO: TX634D141D

DATE: February 18, 1983

PAGE 3 OF 6

DEVICE TYPE: Source Housing

DIAGRAM:



**REGISTRY OF RADIOACTIVE SEALED SOURCES AND DEVICES
SAFETY EVALUATION OF DEVICE**

NO: TX634D141B

DATE: February 18, 1983

PAGE 4 OF 6

DEVICE TYPE: Source Housing

CONDITIONS OF NORMAL USE: This device is used in making density, level and interface measurements on all types of industrial process lines in industrial environments, on drilling platforms, ships, submarines, dredges, barges, trucks, lowered into the ocean, etc. It is difficult to conceive an environment, short of extremely high temperatures, in which the devices could not be safely used. The typical user would include any manufacturing process including food and, therefore, environments could range all the way from extremely harsh (by way of acids, corrosives and/or toxic vapors and fumes) to laboratory sterile rooms with preconditioned air. They could be used both above and below ground with an expected temperature range of 400°F to -100°F. These devices are routinely used as component parts of other systems. Their care and maintenance is minimal. These devices will withstand extremely harsh environments. As long as the temperatures do not exceed the melting point of lead they can remain in use. If temperatures exceed the melting point of lead, the device will fail in an inoperable mode; that is, the first void volume closed by lead expansion will be the beam port. Short of vaporizing lead, the device should not fail in a condition that constitutes an unacceptable hazard. If the lead is vaporized, the failure will occur at the expansion plug and the lead will continue to run out until temperatures drop and the lead solidifies. In the worst case, the source will remain in the head and one will simply have an external radiation problem. This shutter block has been designed so that it is visually accessible to the user; therefore, one can access any loss of lead by simply inspecting the beam port and shutter block.

PROTOTYPE TESTING: Prototypes were tested in accordance with American National Standard N538-1979, published as NBS Handbook 129. As a result of those tests, this device was assigned a classification of ANSI 64-454-555-R3.

EXTERNAL RADIATION LEVELS: This device is designed to include sufficient shielding to reduce radiation levels everywhere to less than 5 mR/hr at one foot from any accessible surface at maximum loading. At the maximum loading this device complies with all applicable regulations and will not require additional posting, personnel monitoring or controlling of the area.

REGISTRY OF RADIOACTIVE SEALED SOURCES AND DEVICES
SAFETY EVALUATION OF DEVICE

NO: TX634D141B

DATE: February 18, 1983

PAGE 5 OF 6

DEVICE TYPE: Source Housing

QUALITY ASSURANCE AND CONTROL: The construction of the gauge is typical high-quality, welded steel with lead fill. These devices are tested as a function of temperature, drop, vibration and shock with the maximum drop being from a 14 foot elevated platform to an unyielding surface and vibration and shock in excess of 20Gs.

LIMITATIONS AND/OR OTHER CONSIDERATIONS OF USE:

1. This device may be distributed to either generally or specifically licensed individuals.
2. Because of the construction of the source and the nature of the radioactive material, a three year leak test interval has been granted.
3. The device is designed and supplied with sufficient information for an individual to unpack and safely mount both the source head and detector following manufacturer's instructions. Initial radiation survey and leak testing should be done by someone specifically authorized to do so.
4. All applicable services are provided by the manufacturer including training.

SAFETY ANALYSIS SUMMARY: This device was found to provide a safe method of making density, level and interface measurements in all types of industrial environments. This device will withstand acid or corrosive atmospheres, high pressures, and temperature environments up to the melting point of lead. If temperatures exceed the melting point of lead, the device will fail in an inoperable mode; that is, the first void volume closed by lead expansion will be the beam port. Short of vaporizing lead, the device should not fail in a condition that constitutes an unacceptable hazard. If the lead is vaporized, the failure will occur at the expansion plug and the lead will continue to run out until temperatures drop and the lead solidifies. In the worst case, the source will remain in the head and one will simply have an external radiation problem.

REGISTRY OF RADIOACTIVE SEALED SOURCES AND DEVICES
SAFETY EVALUATION OF DEVICE

NO: TX634D141B

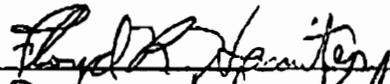
DATE: February 18, 1983

PAGE 6 OF 6

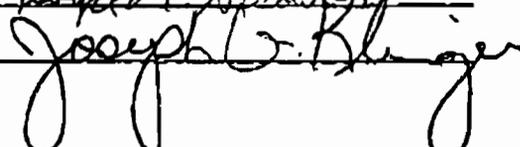
DEVICE TYPE: Source Housing

REFERENCES: This summary was prepared with the aid of the Texas Nuclear Corporation letter dated January 26, 1983 and all associated drawings, documents and procedures.

DATE: February 18, 1983

REVIEWED BY: 

DATE: February 18, 1983

REVIEWED BY: 

ISSUING AGENCY: Texas Department of Health

Feb 2011

REGISTRY OF RADIOACTIVE SEALED SOURCES AND DEVICES
SAFETY EVALUATION OF DEVICE

Corrected Page 1 - May 9, 2002

NO: TX0634D138B

DATE: April 6, 1999

PAGE 1 OF 4

DEVICE TYPE: Source Housing

MODEL: 5201, 5201A

MANUFACTURER/DISTRIBUTOR: **Thermo MeasureTech**
(formerly TN Technologies)
2555 North IH-35
Round Rock, Texas 78664

SEALED SOURCE MODEL DESIGNATION: Thermo MeasureTech Models:
(1) 696894 (5201)
(2) 57157C or
(3) 696894 (5201A)

ISOTOPE: MAXIMUM ACTIVITY:
(1) Cs-137 (1) 200 mCi (7.4 GBq)
(2) Cs-137 (2) 200 mCi (7.4 GBq)
(3) Cs-137 (3) 200 mCi (7.4 GBq)

LEAK TEST FREQUENCY: 36 months

PRINCIPAL USE: (D) Gamma Gauges

CUSTOM DEVICE: YES NO

CUSTOM USER:

REGISTRY OF RADIOACTIVE SEALED SOURCES AND DEVICES
SAFETY EVALUATION OF DEVICE

AMENDED IN ENTIRETY

NO.: TX0634D138B

DATE: April 6, 1999

PAGE 2 OF 4

DEVICE TYPE: Source Housing

DESCRIPTION: The source housing is constructed of lead-filled, welded steel containing all of the features normally associated with a manually operated device. The source housing is a right circular cylinder welded to a base plate and mounted with two welded steel "L" bars. It is approximately 4 inches in diameter by 6 inches high by 8 inches wide and weighs approximately 41 pounds.

The source is retained in the lead filled housing by a 360 degree crimp cushioned by a curved spring washer. For additional safety, the source tube is closed with a steel spring retainer and sealed from the environment by a 0.032 stainless steel expansion plug.

The shutter is comprised of a lead-filled, all welded stainless steel canister secured by welding a steel guide bolt to a stainless steel plate to prevent it from inadvertent movement by vibration or shock. The shutter has both ON and OFF position indicated on the source head by tags, is secured in the OFF position by lock and the ON position by pin. In the ON position, the beam is emitted into approximately a 13° beam angle, conical in shape. In the last quarter of 1984, several cosmetic changes were made to this device. When looking at the back of the source holder, the shutter handle is on the right side of the device. A pneumatic control can be placed on the source holder to remotely control the shutter. If this control fails, a manual valve may be turned to release the air pressure and manually close the shutter. A manual standard arm assembly (standard block) can be placed on the left side of the source holder to block a portion of the beam reducing the radiation field to a preselected value. In addition, a manual interlock device can be installed on the source holder that requires a key to the entry of the vessel to be used to allow the shutter to be placed in the ON position after the vessel has been secured.

Gauges with the "A" suffix in the model number have the source cavity enlarged to take the Model 57157C sealed source. A stainless steel adapter with the same outer dimensions as the Model 57157C can be inserted into the source cavity to allow the Model 696894 to replace the Model 57157C. A hole in the beam port end of the adapter allows full transmission of the gamma rays of the smaller source. The model 5201 gauges are designed to hold only the Model 696894 sealed source.

LABELING: The gauge is tagged with a standard tag, containing the company's name, trade mark, and symbol and the model, isotope, amount of activity, date of measurement, CAUTION RADIOACTIVE MATERIAL, and DO NOT REMOVE. The tag is stainless steel and the radiation symbol is color coded. Additionally, the device contains a separate caution tag which uses both words and symbols to caution users to keep their hands out of the beam area as an added safety feature. The third tag is a shipping bolt tag which serves to caution those individuals not authorized to install and survey gauging devices not to proceed with opening the shutter. For those devices distributed to general licensees, another tag will be added which specifies all details and conditions of general license distribution and the requirements that the user must follow as set out in the Title 25 Texas Administrative Code §289.252(h)(4)(A)(iii). These tags are manufacturing using a second surface printed polyester laminated with pressure sensitive adhesives and tamper proof construction.



REGISTRY OF RADIOACTIVE SEALED SOURCES AND DEVICES
SAFETY EVALUATION OF DEVICE

AMENDED IN ENTIRETY

NO.: TX0634D138B

DATE: April 6, 1999

PAGE 3 OF 4

DEVICE TYPE: Source Housing

DIAGRAM: See attachments 1, 2, and 3.

CONDITIONS OF NORMAL USE: This device is used in making density, level and interface measurements on all types of industrial ships, submarines, dredges, barges, trucks, lowered into the ocean, etc. It is difficult to conceive an environment, short of extremely high temperatures, in which these devices could not be safely used. The typical user would include any manufacturing process including food and, therefore, environments could range all the way from extremely harsh (by way of acids, corrosives and/or toxic vapors and fumes) to laboratory sterile rooms with preconditioned air. They could be used both above and below ground with an expected temperature range of 400°F to -100°F. These devices are routinely used as component parts of other systems. Their care and maintenance is minimal. These devices will withstand extremely harsh environments. As long as the temperatures do not exceed the melting point of lead they can remain in use. If temperatures exceed the melting point of lead, the device will fail in an inoperable mode; that is, the first void volume closed by lead expansion will be the beam port. Short of vaporizing lead, the device should not fail in a condition that constitutes an unacceptable hazard. If the lead is vaporized, the failure will occur at the expansion plug and the lead will continue to run out until temperatures drop and the lead solidifies. In the worst case, the source will remain in the head and one will simply have an external radiation problem. This shutter block has been designed so that it is visually accessible to the user; therefore, one can assess any loss of lead by simply inspecting the beam port and shutter block.

PROTOTYPE TESTING: Prototypes were tested in accordance with American National Standard N538-1979, published as NBS Handbook 129. As a result of those tests, this device was assigned a classification of ANSI 64-454-455-R3.

EXTERNAL RADIATION LEVELS: This device is designed to include sufficient shielding to reduce radiation levels everywhere to less than 5 mR/hr at one foot from any accessible surface at maximum loading. At the maximum loading this device complies with all applicable regulations and will not require additional posting, personnel monitoring or controlling of the area.

QUALITY ASSURANCE AND CONTROL: The construction of the gauge is typical high-quality, welded steel with lead fill. These devices are tested as a function of temperature, drop, vibration and shock with the maximum drop being from a 14 foot elevated platform to an unyielding surface and vibration and shock in excess of 20Gs.



**REGISTRY OF RADIOACTIVE SEALED SOURCES AND DEVICES
SAFETY EVALUATION OF DEVICE**

AMENDED IN ENTIRETY

NO.: TX0634D138B

DATE: April 6, 1999

PAGE 4 OF 4

DEVICE TYPE: Source Housing

LIMITATIONS AND/OR OTHER CONSIDERATIONS OF USE:

- This device may be distributed to either generally or specifically licensed individuals.
- Because of the construction of the source and the nature of the radioactive material, a three year leak interval has been granted.
- The device is designed and supplied with sufficient information for an individual to unpack and safely mount both the source head and detector following manufacturer's instructions. Initial radiation survey and leak testing should be done by someone specifically authorized to do so.
- All applicable services are provided by the manufacturer including training.

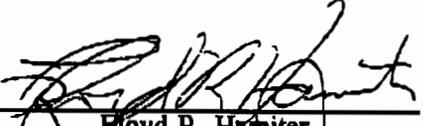
SAFETY ANALYSIS SUMMARY: This device was found to provide a safe method of making density, level and interface measurements in all or corrosive atmospheres, high pressures, and temperature environment up to the melting point of lead. If temperatures exceed the melting point of lead, the device will fail in an inoperable mode; that is, the first void volume closed by lead expansion will be the beam port. Short of vaporizing lead, the device should not fail in a condition that constitutes an unacceptable hazard. If the lead is vaporized, the failure will occur at the expansion plug and the lead will continue to run out until temperatures drop and the lead solidifies. In the worst case, the source will remain in the head and one will simply have an external radiation problem.

REFERENCES: The following supporting documents for TN Technologies, Inc. are hereby incorporated by reference and are made a part of this registry document.

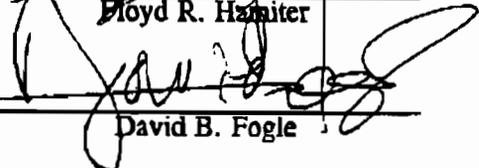
- letter dated January 26, 1983 and all associated drawings, documents and procedures.
- drawing D866760, released September 27, 1984.
- drawing D866761, released May 1, 1987.
- drawing D866763, released September 27, 1984.
- letter dated August 14, 1995, and all associated drawings, documents and procedures.

ISSUING AGENCY: Texas Department of Health
Bureau of Radiation Control

Date: April 6, 1999

Reviewer: 
Floyd R. Hazaiter

Date: April 6, 1999

Concurrence: 
David B. Fogle



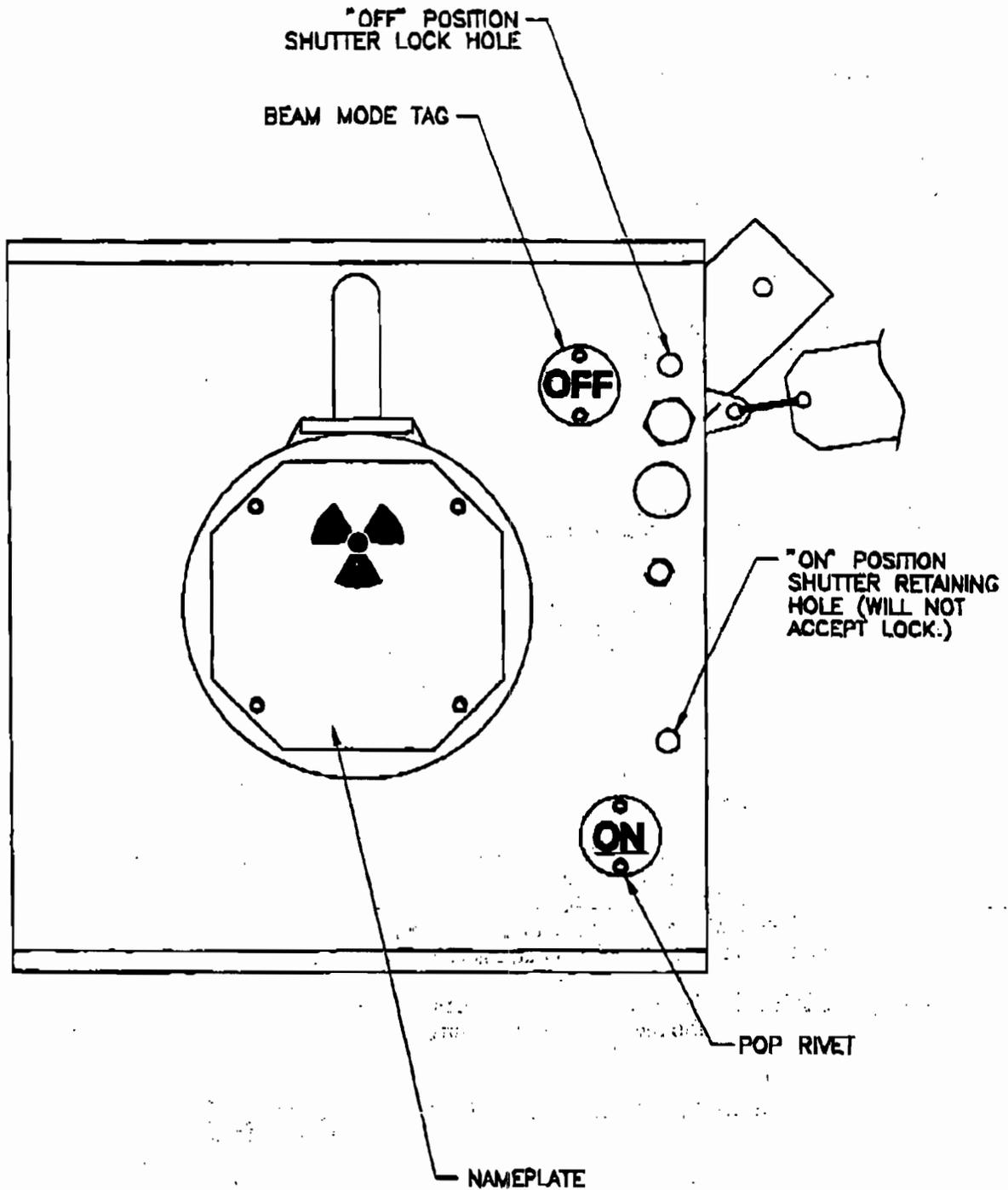
REGISTRY OF RADIOACTIVE SEALED SOURCES AND DEVICES SAFETY EVALUATION OF DEVICE

NO.: TX0634D138B

AMENDED IN ENTIRETY

DATE: January 11, 1996

ATTACHMENT 1

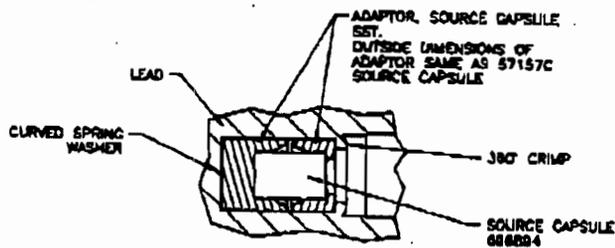
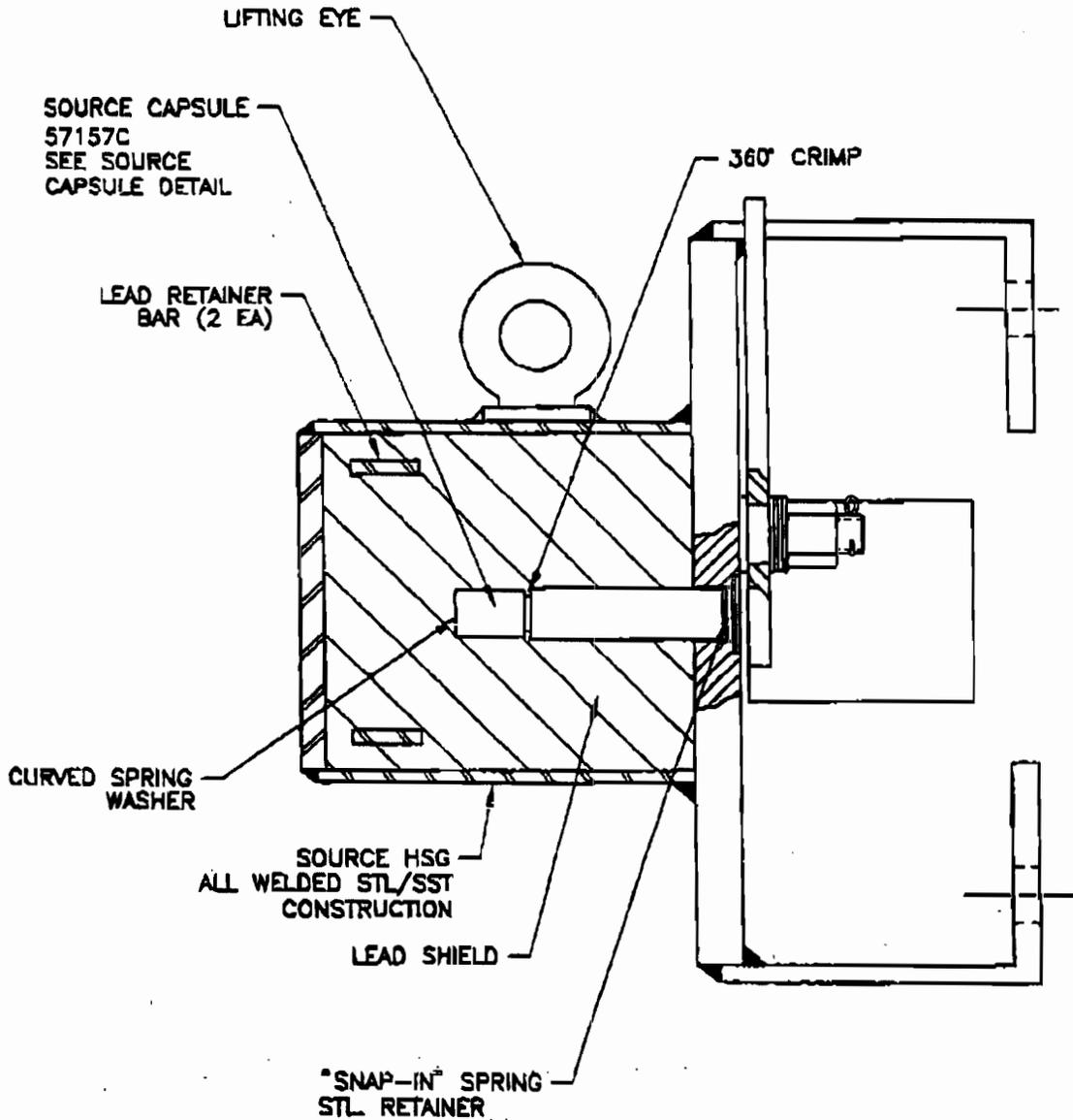


REGISTRY OF RADIOACTIVE SEALED SOURCES AND DEVICES SAFETY EVALUATION OF DEVICE

NO.: TX0634D138B

AMENDED IN ENTIRETY
DATE: January 11, 1996

ATTACHMENT 2



SOURCE CAPSULE DETAIL
INSTALLATION OF 696894 SOURCE CAPSULE



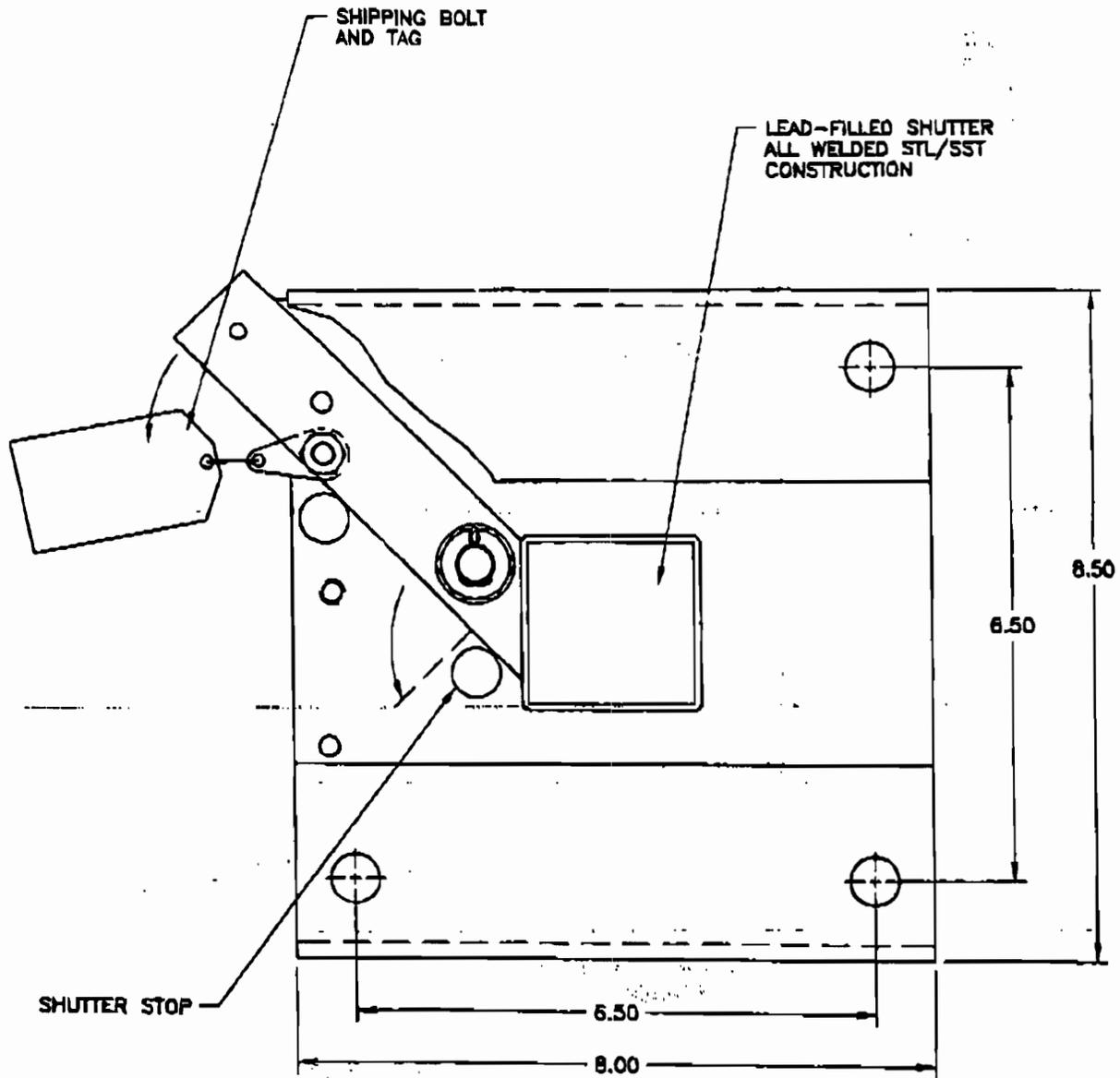
REGISTRY OF RADIOACTIVE SEALED SOURCES AND DEVICES
SAFETY EVALUATION OF DEVICE

NO.: TX0634D138B

AMENDED IN ENTIRETY

DATE: January 11, 1996

ATTACHMENT 3



REGISTRY OF RADIOACTIVE SEALED SOURCES AND DEVICES
SAFETY EVALUATION OF DEVICE

Corrected Page

NO.: TX0628D142B

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DEVICE TYPE: Source Housing

MODEL: 5205, 5205A

MANUFACTURER/DISTRIBUTOR: TN Technologies Inc.
P. O. Box 800
Round Rock, Texas 78680-0800

SEALED SOURCE MODEL DESIGNATION: (1) 696894 (5205)
(2) 57157C or (3) 696894 (5205A)

ISOTOPE:

MAXIMUM ACTIVITY:

- (1) Cs-137
- (2) Cs-137
- (3) Cs-137

- (1) 200 mCi (7.4 GBq)
- (2) 200 mCi (7.4 GBq)
- (3) 200 mCi (7.4 GBq)

LEAK TEST FREQUENCY: 36 months

PRINCIPAL USE: (D) Gamma Gauges

CUSTOM DEVICE: _____ YES X NO

CUSTOM USER:

REGISTRY OF RADIOACTIVE SEALED SOURCES AND DEVICES
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DEVICE TYPE: Source Housing

DESCRIPTION: The source housing is constructed of lead-filled, welded steel containing all of the features normally associated with a manually operated device. The source housing is a right circular cylinder welded to a base plate and mounted with two welded steel "L" bars. It is approximately 4 inches in diameter by 4.3 inches high by 8.5 inches wide by 10.6 inches long and weighs approximately 44 pounds.

The source is retained in the lead filled housing by a 360° crimp cushioned by a curved spring washer. The collimating slot is covered by a 1/8 inch thick stainless steel cover plate, sealed with RTV silicon sealant and held in place by four 1/4 inch diameter steel drive rivets.

The shutter is comprised of a lead-filled, all welded stainless steel canister secured by welding a steel guide bolt to a stainless steel plate to prevent it from inadvertent movement by vibration or shock. The shutter has both ON and OFF position indicated on the source head by tags, is secured in the OFF position by lock and the ON position by pin. In the ON position, the beam is emitted into approximately a 45° beam angle, and collimated into a fan shape.

Gauges with the "A" suffix in the model number have the source cavity enlarged to take the Model 57157C sealed source. A Stainless Steel adapter with the same outer dimensions as the Model 57157C can be inserted into the source cavity to allow the Model 696894 to replace the Model 57157C. A hole in the beam port end of the adapter allows full transmission of the gamma rays of the smaller source. The Model 5205 gauges are designed to hold only the Model 696894 sealed source.

LABELING: The gauge is tagged with a standard tag, containing the company's name, trade mark, and symbol and the model, isotope, amount of activity, date of measurement, CAUTION RADIOACTIVE MATERIAL, and DO NOT REMOVE. The tag is stainless steel and the radiation symbol is color coded. Additionally, the device contains a separate caution tag which uses both words and symbols to caution users to keep their hands out of the beam area as an added safety feature. The third tag is a shipping bolt tags which serves to caution those individuals not authorized to install and survey gauging devices not to proceed with opening the shutter. For those devices distributed to general licensees, another tag will be added which specifies all details and conditions of general license distribution and the requirements that the user must follow as set out in the Texas Regulations for Control of Radiation 41.28 (d)(1)(iii). These tags are manufacturing using a second surface printed polyester laminated with pressure sensitive adhesives and tamper proof construction.

DIAGRAM:

See attachments 1, 2, and 3.

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DEVICE TYPE: Source Housing

CONDITIONS OF NORMAL USE: This device is used in making density, level and interface measurements on all types of industrial ships, submarines, dredges, barges, trucks, lowered into the ocean, etc. It is difficult to conceive an environment, short of extremely high temperatures, in which the devices could not be safely used. The typical user would include any manufacturing process including food and, therefore, environments could range all the way from extremely harsh (by way of acids, corrosives and/or toxic vapors and fumes) to laboratory sterile rooms with preconditioned air. They could be used both above and below ground with an expected temperature range of 400°F to -100°F. These devices are routinely used as component parts of other systems. Their care and maintenance is minimal. These devices will withstand extremely harsh environments. As long as the temperatures do not exceed the melting point of lead they can remain in use. If temperatures exceed the melting point of lead, the device will fail in an inoperable mode; that is, the first void volume closed by lead expansion will be the beam port. Short of vaporizing lead, the device should not fail in a condition that constitutes an unacceptable hazard. If the lead is vaporized, the failure will occur at the expansion plug and the lead will continue to run out until temperatures drop and the lead solidifies. In the worst case, the source will remain in the head and one will simply have an external radiation problem. This shutter block has been designed so that it is visually accessible to the user; therefore, one can assess any loss of lead by simply inspecting the beam port and shutter block.

PROTOTYPE TESTING: Prototypes were tested in accordance with American National Standard N538-1979, published as NBS Handbook 129. As a result of those tests, this device was assigned a classification of ANSI 54-4.54-4.55-R3.

EXTERNAL RADIATION LEVELS: This device is designed to include sufficient shielding to reduce radiation levels everywhere to less than 5 mR/hr at one foot from any accessible surface at maximum loading. At the maximum loading this device complies with all applicable regulations and will not require additional posting, personnel monitoring or controlling of the area.

QUALITY ASSURANCE AND CONTROL: The construction of the gauge is typical high-quality, welded steel with lead fill. These devices are tested as a function of temperature, drop, vibration and shock with the maximum drop being from a 14 foot elevated platform to an unyielding surface and vibration and shock in excess of 20Gs.

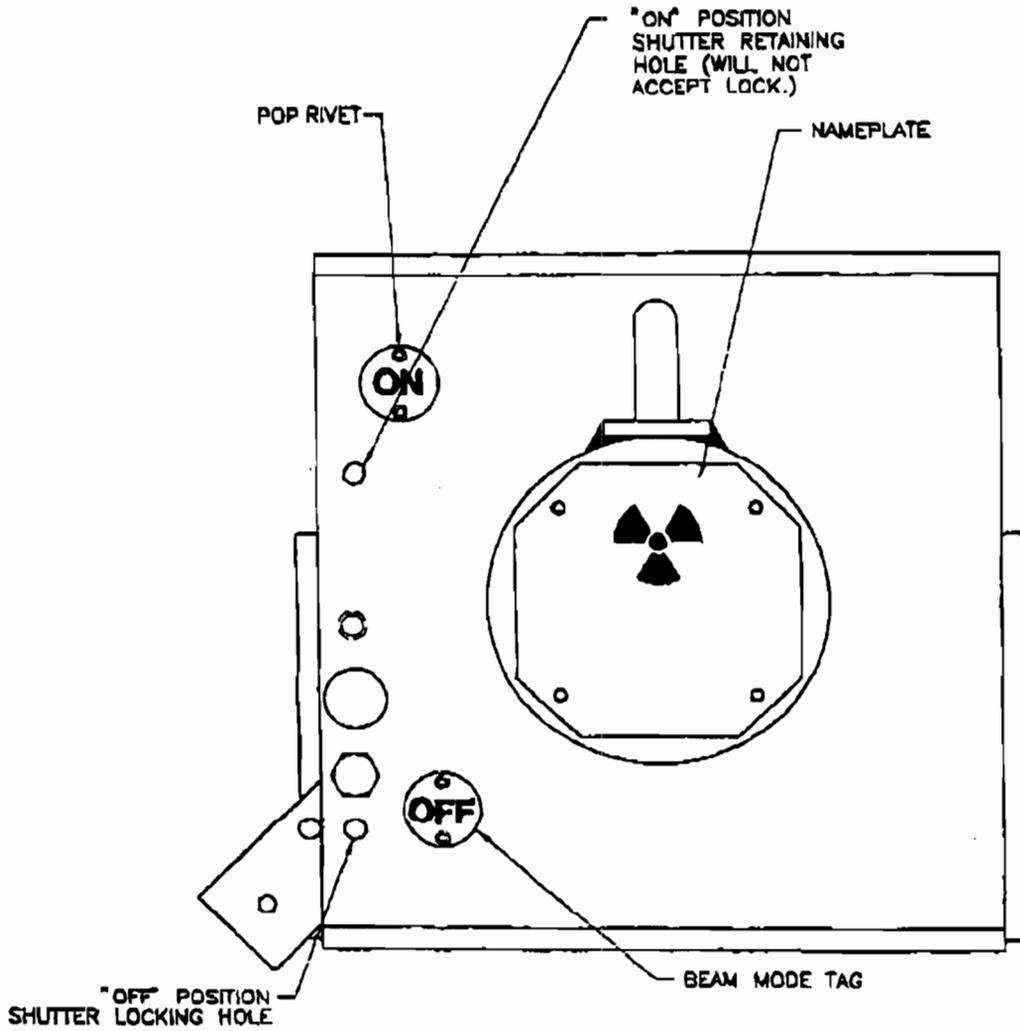
REGISTRY OF RADIOACTIVE SEALED SOURCES AND DEVICES
SAFETY EVALUATION OF DEVICE

AMENDED IN ENTIRETY

NO.: TX0634D142B

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ATTACHMENT 1



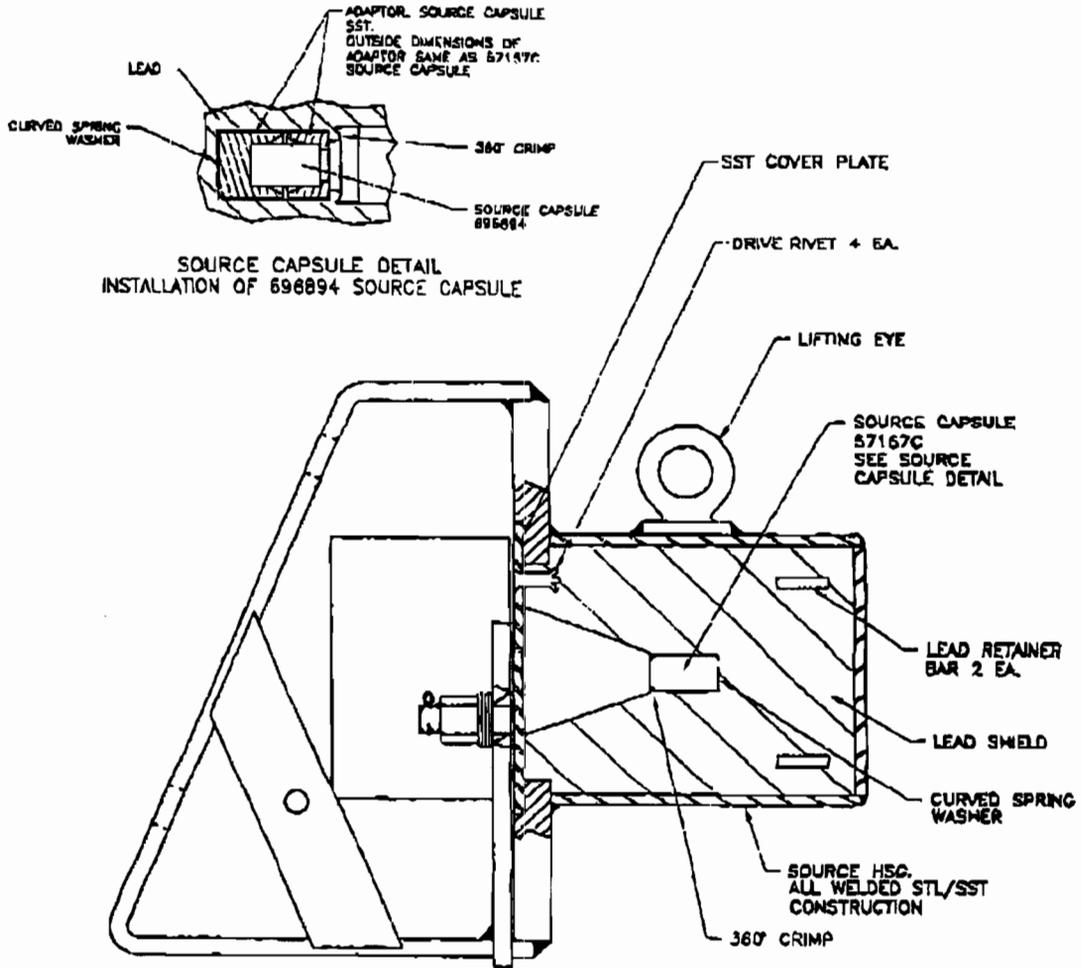
REGISTRY OF RADIOACTIVE SEALED SOURCES AND DEVICES
SAFETY EVALUATION OF DEVICE

AMENDED IN ENTIRETY

NO.: TX0634D142B

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ATTACHMENT 2



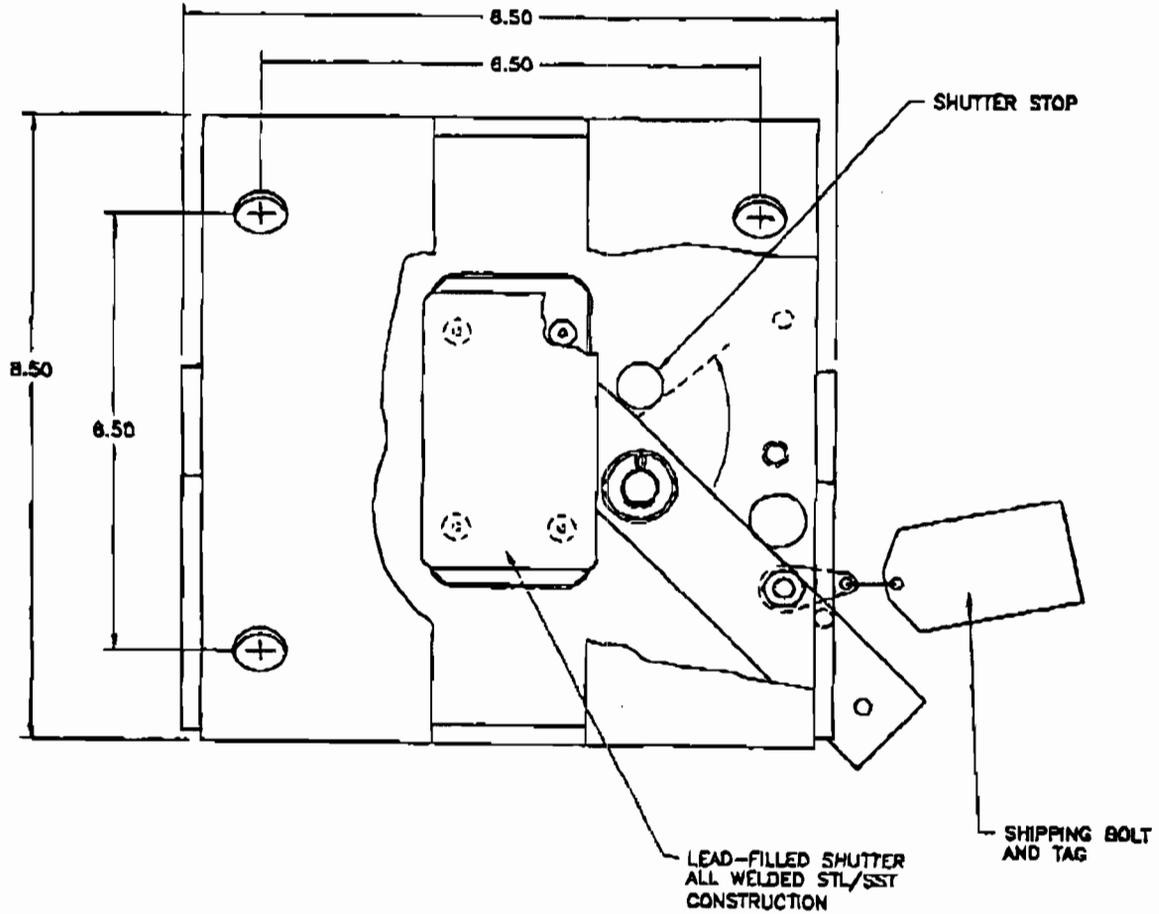
REGISTRY OF RADIOACTIVE SEALED SOURCES AND DEVICES
SAFETY EVALUATION OF DEVICE

AMENDED IN ENTIRETY

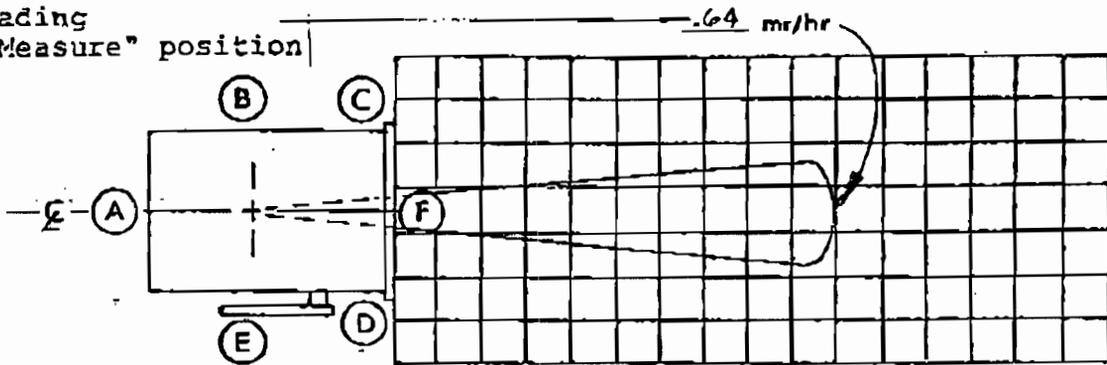
NO.: TX0634D142B

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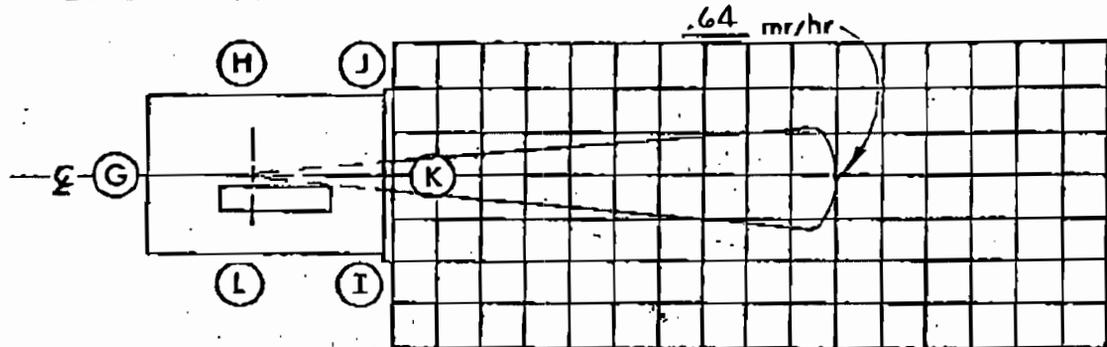
ATTACHMENT 3



Open air reading
Source in "Measure" position



SCALE: 1/4" = 1 meter



RADIATION LEVELS mr/hr (See notes 1 & 3)		
CODE	SURFACE	12" (305mm) FROM SURFACE
A	3.0	.4
B	3.0	.4
C	1.0	.3
D	1.0	.3
E	3.0	.4
F	3.0	.5
G	3.0	.4
H	3.0	.4
I	1.0	.3
J	1.0	.3
K	3.0	.5
L	3.0	.4

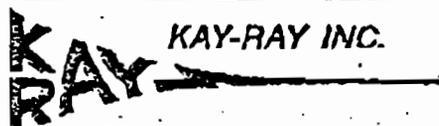
SOURCE TYPE: Cs 137
 SOURCE SIZE: 200mc
 MAX. SOURCE SIZE: 2000mc
 COLLIMATOR TYPE: CONICAL
 COLLIMATOR SIZE: 10°x10°
 REFERENCE DWG: # 951-706306

Note 1: Radiation levels are for the source size indicated on the drawing. For other loadings the radiation level increases or decreases in direct proportion to source size.

Note 2: The isodose curve is shown for the source size indicated on the drawing. For other distances the radiation level increases or decreases according to inverse square law.

Note 3: The isodose curve is with the shutter in the "Store" position.

Note 4: Point F and K reflect worse case reading in front of head not necessarily the reading directly in front of store block. This is not considered an accessible surface once properly installed.

RADIATION LEVELS-MODEL 7063 P GAMMA SOURCE HEAD				 KAY-RAY INC. Arlington Heights, Illinois USA	
SCALE <u>1/4"</u>					
TOLERANCES UNLESS OTHERWISE SHOWN					
NO.	REVISIONS	DATE	APP	DWN. BY T. CORNING	DATE 12/20/76
				APP. BY <u>John D. Camp</u>	DATE <u>1/21/76</u>
DWG. NO. 950-63P200					

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SAFETY EVALUATION OF DEVICE

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DEVICE TYPE: Source Housing

MODEL: 7063, 7063P, 7063S and 7063PS

MANUFACTURER/DISTRIBUTOR: TN Technologies-Kay-Ray/Sensall Inc.
P.O. Box 800
Round Rock, Texas 78680-0800

SEALED SOURCE MODEL DESIGNATION: Kay-Ray Model 7700-Y

ISOTOPE: Cs-137

MAXIMUM ACTIVITY: 2000 mCi (74.0 GBq)

LEAK TEST FREQUENCY: 36 Months

PRINCIPAL USE: Gamma Gauge (D)

CUSTOM DEVICE: YES NO

CUSTOM USER:

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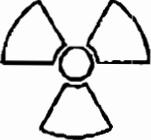
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DEVICE TYPE: Source Housing

DESCRIPTION: The Model 7063 and 7063P and the Model 7063S and 7063PS source shield consists of a 6" diameter cylinder 10- 3/16" long. This cylinder is welded shut on one end and filled with lead to a 6" depth. The source is crimped into the end of a small aluminum tube approximately one-third of an inch in diameter and 3" long. This tube is inserted into the center of the lead shielding. The outer cylinder for the Models 7063 and 7063P are of cold rolled steel and the Models 7063S and 7063PS are stainless steel. A collimator is cut into the lead shielding of the Models 7063/7063S to allow a beam of 7 degrees in the X direction and 40 degrees in the Y direction to be emitted. The collimator for the 7063P/7063PS allows a beam of only 7 degrees in either the X or Y direction. The shutter mechanism is mounted inside the front third of the cylinder and sealed from the outside environment.

The shutter mechanism is a lead block attached to a robust shaft which rotates out of the beam. The shaft has the capability of being locked in the safe or OFF position. The shaft can also be fixed to a mechanical device that can be operated remotely to move the shutter.

LABELING: The Models 7063 (7063S) and 7063P (7063PS) are labelled in accordance with the requirements of 10 CFR 32.51 if the device is distributed as a generally licensed device. All devices are labelled in accordance with 10 CFR 20.203, as shown below.

ACTIVITY <input type="text"/> ISOTOPE <input type="text"/> DATE OF MEASUREMENT <input type="text"/>	 CAUTION	TAG NUMBER <input type="text"/> MODEL NUMBER <input type="text"/> SERIAL NUMBER <input type="text"/>
USA DOT 7A TYPE A RADIOACTIVE MATERIAL		
THIS LABEL SHALL BE MAINTAINED ON THE DEVICE IN A LEGIBLE CONDITION REMOVAL OF LABEL PROHIBITED		

This label is a Brady poly-plate .007" shiny finish polyester film with a B-209 pressure sensitive adhesive on the back. The entire background is yellow, letters to be black, and the trefoil will be magenta. The size is 8" X 5 5/8", but can vary.

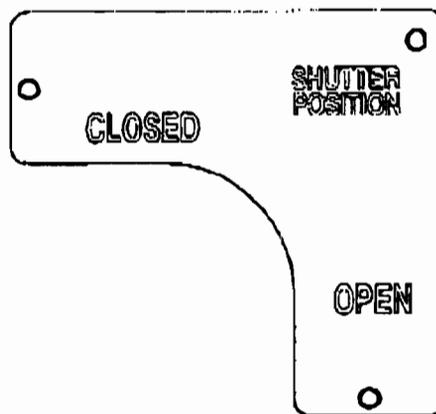
**REGISTRY OF RADIOACTIVE SEALED SOURCES AND DEVICES
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PAGE 3 OF 7**DEVICE TYPE:** Source Housing

LABELING (Cont'd): The ON-OFF label (seen below) is 0.020" thick stainless steel with a pressure sensitive adhesive backing. The letters are a black enamel on an etched background.

**DIAGRAM:** See Attachments.

CONDITIONS OF NORMAL USE: The 7063/7063S and 7063P/7063PS are designed to be used in all manufacturing processes. Environments could range from extremely harsh (e.g., acids, corrosives and/or toxic vapors) to laboratory sterile rooms with preconditioned air. They can be used both above and below ground with an expected temperature range from 400°F to -100°F. They are more routinely used as component parts of other systems. The 7063/7063S will typically be used in continuous level monitoring or belt scale applications where the requirement for a fan-shaped radiation beam exists. The 7063P/7063PS will typically be used for density and point level measurements. Their care and maintenance is minimal. Because of the rugged design, a useful lifetime of 15 years is expected.

PROTOTYPE TESTING: These devices have been tested in accordance with American National Standard N538-1979 and have achieved a classification of 64-455-455-R1. No severe accidents or incidents have occurred during this device's use in the last twenty years.

**REGISTRY OF RADIOACTIVE SEALED SOURCES AND DEVICES
SAFETY EVALUATION OF DEVICE**

NQ: TX0634D173B

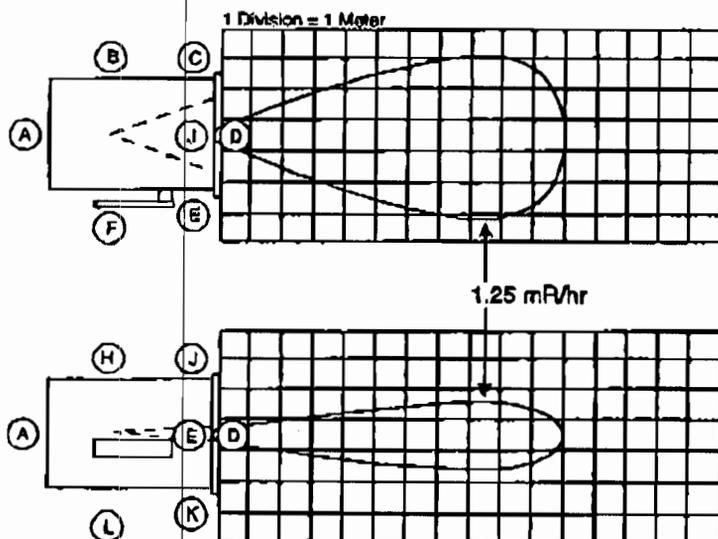
DATE: June 2, 2000

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DEVICE TYPE: Source Housing

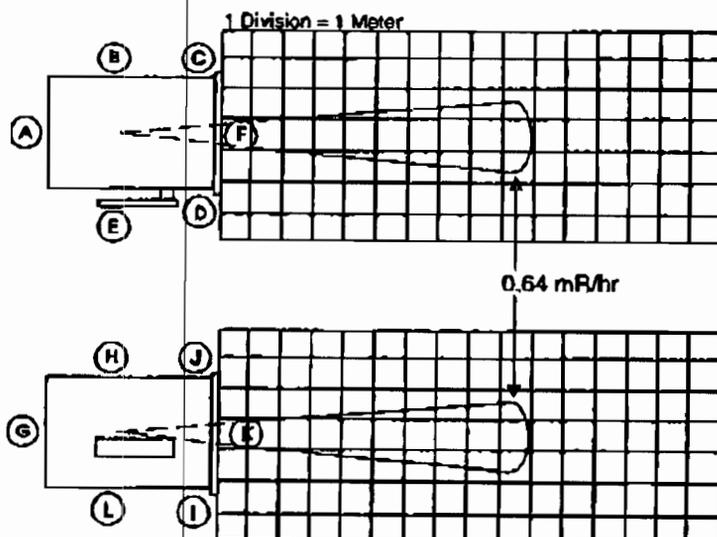
EXTERNAL RADIATION LEVELS: External radiation dose rates for these devices were determined to be nominal. The surveys were conducted using a standard GM detector placed at representative points around the source holder. Below the values found for a 7063/7063S with 500 mCi of Cs-137 are presented.

Radiation Levels mR/hr		
Code	Surface	12" from Surface
A	7.75	0.69
B	8.25	0.94
C	7.50	0.45
D	12.0	1.05
E	5.75	0.58
F	6.50	0.63
G		
H	7.50	0.65
I		
J	7.00	0.38
K	5.25	0.32
L	7.75	0.62



Typical exposure rates for a 7063P/7063PS containing 200 mCi of Cs-137 are displayed below.

Radiation Levels mR/hr		
Code	Surface	12" from Surface
A	3.0	0.4
B	3.0	0.4
C	1.0	0.3
D	1.0	0.3
E	3.0	0.4
F	3.0	0.5
G	3.0	0.4
H	3.0	0.4
I	1.0	0.3
J	1.0	0.3
K	3.0	0.5
L	3.0	0.4



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PAGE 5 OF 7DEVICE TYPE: Source Housing

QUALITY ASSURANCE AND CONTROL: Strict adherence to original design specifications and close inspection and testing of each completed device are required by the manufacturer's procedures. Any deviation below those specifications or inadequate performance during testing will cause the device to be rejected. Each source is leak tested within thirty days of distribution and appropriate leak test certificates are furnished to the customer.

LIMITATIONS AND/OR OTHER CONSIDERATIONS OF USE:

- These devices may be distributed to either specific or general licensees of the NRC or an Agreement State.
- Installation, maintenance, repair, initial survey, and disposal shall be performed by TN Technologies - Kay-Ray/Sensall, or other persons specifically licensed by the NRC or an Agreement State to perform such services. The user is authorized to mount the source holder.
- When installed, the Model 7063/7063S and 7063P/7063PS source housings should be protected from exposure to environmental factors such as highly corrosive chemicals, temperature extremes, impact, vibration, fire, and/or explosion as appropriate to the intended use. In cases where source housings are not installed in contact with the vessel, the licensing authority should determine the specific protective device that will be included to prevent insertion of hands, arms, etc. into the radiation beam.
- For applications where access to the interior of the vessel is possible, the use of an interlock system must be required to prevent access to the vessel while the shutter is in the open position.
- Generally licensed devices will have a maximum activity of 500 millicuries.
- User Training: The licensing authority should determine the extent of user training and experience with gauging devices. Normally, the training should be provided by the gauge manufacturer/distributor and should include a description of the nature and extent of potential radiation hazards and the necessary procedures to protect against these hazards. Both routine and emergency operations should be considered. A copy of the manufacturer's radiation safety instructions for the 7063/7063S & 7063P/7063PS should be provided to each user.
- Leak Testing and Shutter Test: These tests shall be performed by TN Technologies - Kay-Ray/Sensall or other persons specifically authorized by the NRC or an Agreement State. Tests shall be performed in accordance with procedures specified by TN Technologies - Kay-Ray/Sensall or other procedures authorized by the licensing authority. Users may be authorized to collect leak test samples for analysis by the manufacturer or other authorized vendors. Tests shall be conducted at intervals not to exceed three years.
- Model 7063/7063S or 7063P/7063PS source housings shall be removed from service and transferred to a licensed disposal service only by TN Technologies - Kay-Ray/Sensall or other persons specifically licensed by the NRC or an Agreement State to perform these services.

**REGISTRY OF RADIOACTIVE SEALED SOURCES AND DEVICES
SAFETY EVALUATION OF DEVICE**

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DEVICE TYPE: Source Housing

SAFETY ANALYSIS SUMMARY: The 7063/7063S and 7063P/7063PS were approved for distribution both to specific licensees and general licensees in 1981 by the NRC. In 1994, the Illinois Department of Nuclear Safety concurred with that evaluation. At that time, Kay-Ray submitted sufficient information to provide reasonable assurance that:

- The device can be safely operated by persons not having training in radiological protection.
- Under ordinary conditions of handling, storage and use of the device, the byproduct material contained in the device will not be released or inadvertently removed from the device, and it is unlikely that any person will receive in any period of one calendar quarter a dose in excess of 10 percent of the limits specified in 10 CFR 20.101(a).
- Under accident conditions (such as fire and explosion) associated with handling, storage and use of the device, it is unlikely that any person would receive an external radiation dose or dose commitment in excess of the dose to the appropriate organ as specified in the following chart:

<u>PART OF THE BODY</u>	<u>rem</u>
Whole body; head and trunk; active blood-forming organs; gonads; or lens of eye	15
Hands and forearms; feet and ankles; localized areas of skin averaged over areas no larger than 1 square centimeter	200
Other organs	50

Based on the above and the information referenced below, we continue to conclude that these source housings are acceptable for distribution to specific and general licensees. Further, we conclude that the source housings can be expected to maintain their containment integrity adequately for normal conditions of use and for accidental conditions that might occur during use.

REFERENCES:

The following supporting documents for TN Technologies Inc. are hereby incorporated by reference and are made a part of this registry document.

- Superseded registration document numbers NR-412-D-122-B and IL-412-D-122-B.
- Letter dated April 10, 2000 with attachments.
- Letter dated May 19, 2000 with attachments.
- Manuals received May 30, 2000.

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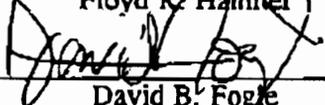
DEVICE TYPE: Source Housing

ISSUING AGENCY: Texas Department of Health
Bureau of Radiation Control

Date: June 2, 2000

Reviewer: 
Floyd R. Hamiter

Date: June 2, 2000

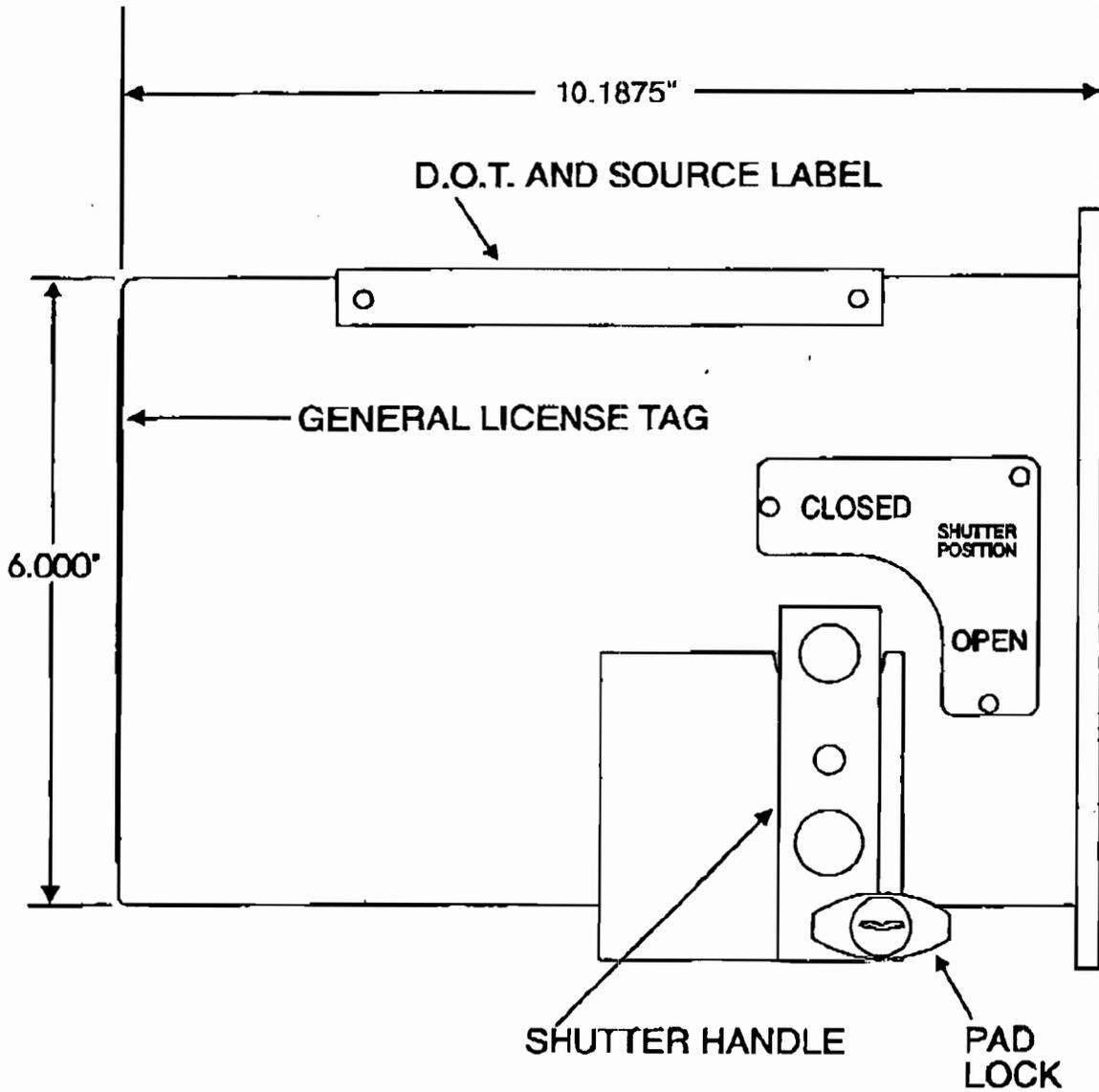
Concurrence: 
David B. Fogle

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ATTACHMENT 1



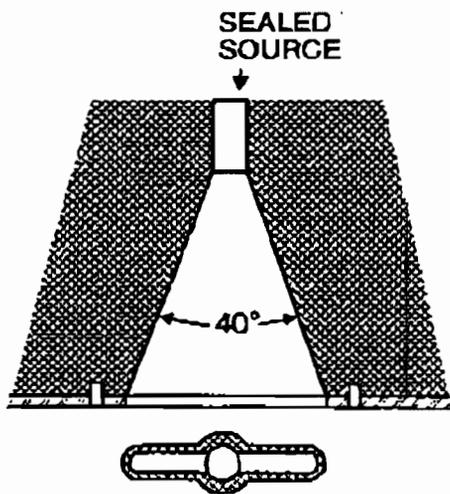
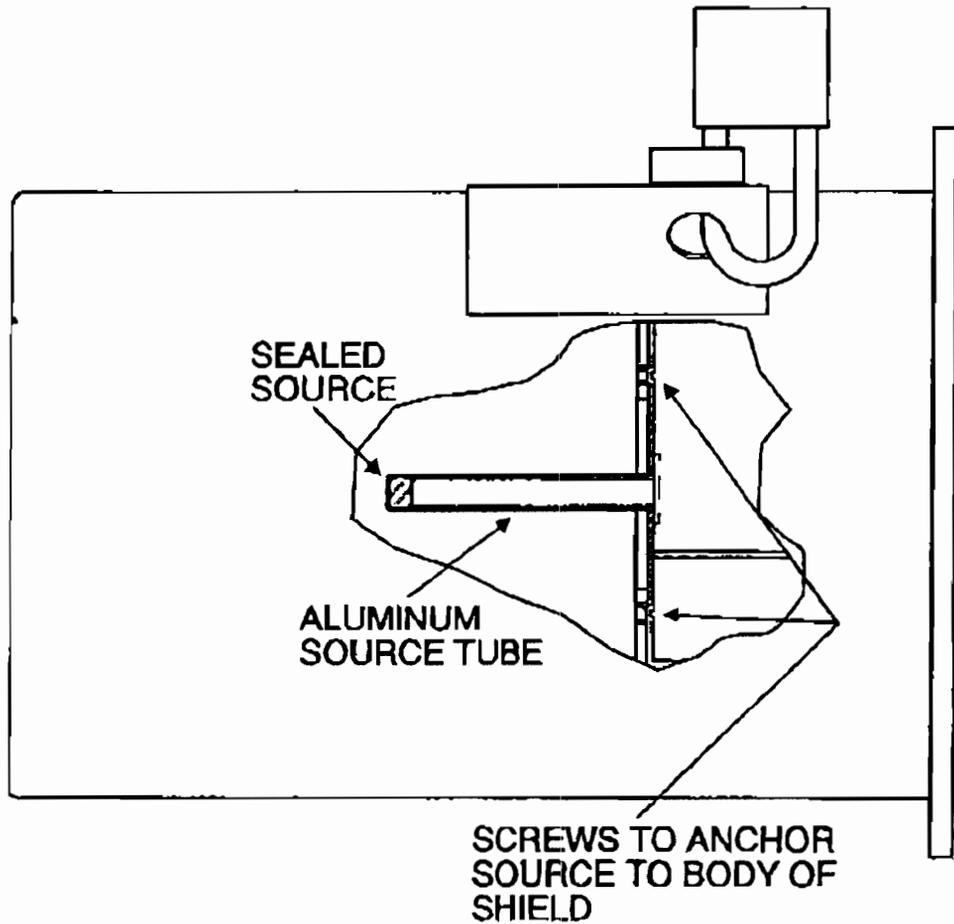
Side View of 7063/7063S and 7063P/7063PS

REGISTRY OF RADIOACTIVE SEALED SOURCES AND DEVICES SAFETY EVALUATION OF DEVICE

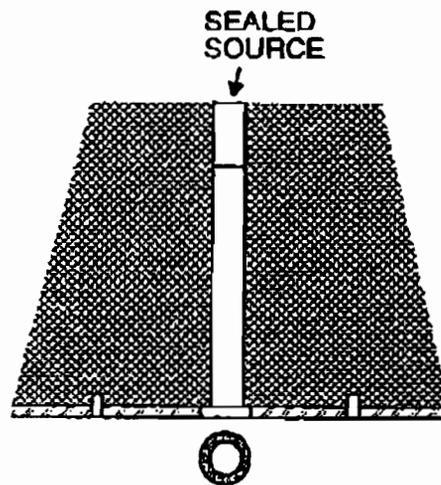
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ATTACHMENT 2



Detail of Collimator for 7063/7063S



Detail for Collimator for 7063P/7063PS

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ATTACHMENT 3

